Larval morphology of Fennoscandian Oreodytes Seidlitz (Coleoptera: Dytiscidae), with notes on hydroporine leg chaetotaxy and taxonomy

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Morphological descriptions are given of all 3 larval instars of *Oreodytes alpinus* (Paykull), and the first 2 instars of *O. septentrionalis* (Gyllenhal). Some characters of comparative value are listed for the previously described larval instars of *O. sanmarkii* (C. R. Sahlberg) and the 3rd instar of *O. septentrionalis*. A key is given to all larval instars of Fennoscandian *Oreodytes*. Leg chaetotaxy is treated in detail, and the primary setation of *Oreodytes* Seidlitz and *Hydroporus* Clairville is described. Notes and comments on the natural history and the taxonomy of the genus are appended.

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Introduction

I have earlier given a preliminary key to the 3rd-instar larvae of the 3 Fennoscandian species of *Oreodytes* Seidlitz (Nilsson 1982a). However, a detailed description of the larva of *O. alpinus* (Paykull), as well as the first 2 instars of *O. septentrionalis* (Gyllenhal), is lacking. As I now have material of all instars of all 3 species the missing descriptions will be provided together with a key to all instars.

Work on *Hydroporus* larvae (Nilsson 1986a, 1987) has stressed the need for a detailed study of leg chaetotaxy. For this purpose I have adopted the nomenclatural system worked out by Wolfe & Roughley (1985). It seems now that this system would be improved if the primary setae, i.e. those present in the first instar, could be separated from the secondary setae which are added in later instars. This would aid comparisons of genera and higher taxa and is a necessary step for phylogenetic analysis (Bousquet & Goulet 1984).

I will in this paper correlate the systems of nomenclature for leg chaetotaxy forwarded by Bousquet & Goulet (1984) and Wolfe & Roughley (1985). This is a first step in the development of a ground plan of chaetotaxal nomenclature for leg setae among hydroporines.

First, I will here correct some points of nomenclature concerning *Oreodytes*. This is necessary for the comparison of phylogenetic placements of adults and larvae.

Classification of Oreodytes

The holarctic genus *Oreodytes* Seidlitz is comprised of some 25 species. The nearctic fauna was revised recently by Zimmerman (1985). Only 5 species occur in Europe, and the palearctic fauna includes also 3 Asian species. As defined by Zimmerman (1985) the genus includes also the 2 Asian species currently placed in *Neonectes* Zimmermann.

The type species of the genus *Oreodytes* Seidlitz, 1887, is incorrectly cited by Zimmerman (1985) as *Hydroporus borealis* Gyllenhal 1827. This species was described by Gyllenhal as *Hyphydrus borealis* and the description was first published *in* Sahlberg (1826: 174). Another problem is that F. Balfour-Browne (1936) misidentified this species when he fixed it as the type species of *Oreodytes* (see J. Balfour-Browne 1944). Based on article 70a–b of the Code it seems that the nominal species in the fixation in this case is the type species, the reverse opinion was held by J. Balfour-Browne (1944). The correct citation is:

genus *Oreodytes* Seidlitz, 1887: 57

Type species *Hyphydrus borealis* Gyllenhal in Sahlberg, 1826: 174 (= *Dytiscus alpinus* Paykull, 1798: 226), fixed by subsequent designation of F. Balfour-Browne, 1936: 77.

Falkenström (1939) recognized two subgenera in the genus *Oreodytes*, and placed *O. alpinus* in *Oreodytes* s. str. and *O. sanmarkii* (C. R. Sahlberg) [= *rivalis* Gyllenhal] together with *O. septentrionalis* in his new subgenus *Oreonectes*. These 3 species are represented in the Nearctic by very similar forms, viz. *O. alpinus* – *O. laevis* (Kirby), *O. sanmarkii* – *O. rivalis* (Gyllenhal sensu Zimmerman 1985), and *O. septentrionalis* – *O. scitulus* (LeConte). The question of synonymy among these species pairs was avoided by Zimmerman (1985) in a recent revision of the nearctic species. However, Zimmerman (1985) after a cladistic analysis based on adult characters recognized 3 species groups. In contrast to Falkenström's (1939) treatment of the genus, he included the species corresponding to *O. alpinus* and *O. septentrionalis* in the same suprageneric taxon (the Scitulus group). This classification is correlated with larval characters as seen in the 3 species here described.

Methods and materials

Larvae of all 3 species were collected together with adults in N Sweden and northernmost Norway. Collecting data are:

O. alpinus: S: ÅN: Hörnefors, Persskär & Snöan, 5.viii. 1979, 15 larvae of instars I–III; VB: Avanäs, Vindelälven, 3.viii.1983, 2 3rd-instar larvae; 29.vi.1986, 4 1st-instar larvae; N: Fi, Alta, 18.vii.1979, 5 3rd-instar larvae. – *O. sanmarkii*: S: VB: Hällnäs, St Sandsjö, 3.vii.1983, 15 larvae of instars I–III; NB: Lahnasuando, Lahnajoki, 24.vii.1983, 20 larvae of instars I–III; NB: Klingersel, Råneälven river, 1–2.vii.1986, 14 larvae of instars II–III: 15–16.vii.1986, 4 larvae of instars II–III; LU: Polcirkeln, Råneälven river, 2–3.vii.1986, 11 larvae of instars II–III; 15–16.vii.1986, 3 larvae of instars II–III; LU: Dokkas, 8.vii.1982, leg. G. Lindgren, 2 3rd-instar larvae; N: Fi, Alta, 18.vii.1979, 5 3rd-instar larvae. – *O. septentrionalis*: S: NB: Lahnasuando, Lahnajoki, 24.vii.1983, 19 larvae of instars I–III; Klingersel, Råneälven river, 1.vii.1986, 1 2nd-instar larva; 15.vii.1986, 2 larvae of instars II–III; LU: Polcirkeln, Råneälven river, 3.vii.1986, 3 larvae of instars I–II.

Larvae of *O. sanmarkii* and *O. septentrionalis* were identified from literature descriptions (Bertrand 1932, De Marzo 1977). The identity of larvae of *O. alpinus* is based on the fact that this is the only species of the genus known to occur in the archipelagos of the Gulf of Bothnia.

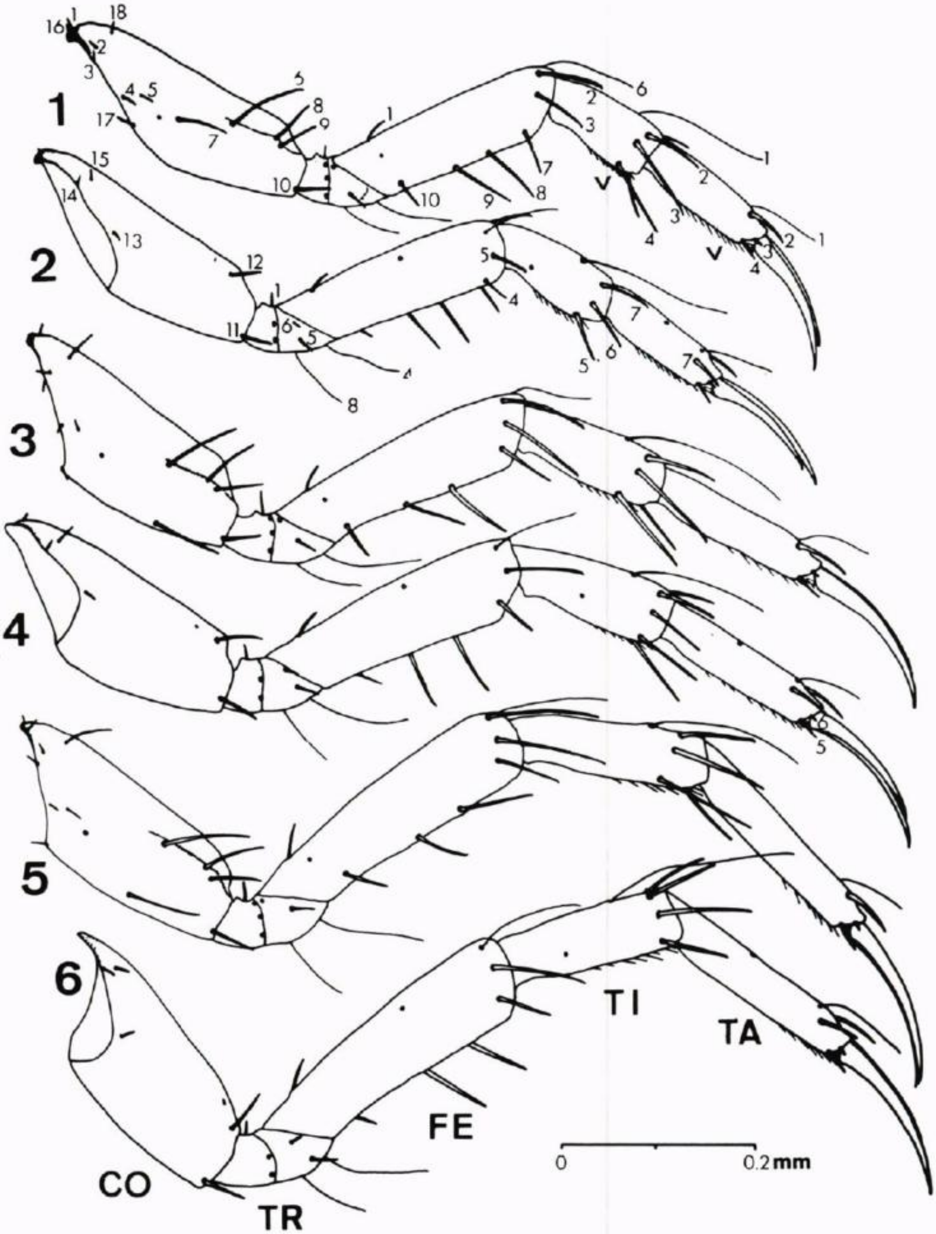
Larvae were preserved in 70 % ethanol and dissected larvae were mounted in euparal on glass slides. All measurements were taken with a micrometer eyepiece. The preserved material is deposited at the Department of Animal Ecology, University of Umeå. Additionally, larvae of *Hydroporus* were examined (Nilsson 1987). Abbreviations used in the descriptions and in the key follow Nilsson (1986a). The term spine is here used for all spiniform setae.

Primary chaetotaxy of hydroporine legs

As the separation of primary and secondary sensilla will lead to some changes in the names applied to individual sensilla, when compared to the work on *Hydroporus* (Nilsson 1986a, 1987), I shall here first deal with chaetotaxal nomenclature of hydroporine legs.

In Figs. 1–6 the sensilla of the legs of the first instar larva of *Oreodytes septentrionalis* are shown. These primary sensilla are the same in all 3 species of *Oreodytes* studied, and they are also essentially identical with the species of *Hydroporus* studied so far. Therefore this pattern may well represent the general pattern of Hydroporini. The secondary leg setation is also very similar in *Oreodytes* and *Hydroporus*. The most important differences are the complete absence of compound spines and the reduction of the tarsal and tibial V series in *Oreodytes*.

All legs have the same basal number of primary sensilla. A few individual sensilla have slightly different positions on the fore leg when compared to the 2 others. To separate the primary sensilla from the secondary ones, their numbers are denoted with an accent. In Figs. 1–6 the numeral notation of Bousquet & Goulet (1984) is used together with the positional codes given below.



Figs. 1–6. *Oreodytes septentrionalis* (Gyllenhal), legs of 1st-instar larva. Setae are denoted individually (numbers correspond to Bousquet & Goulet 1984). TA: 1 – DDiSt, 2 – ADDi, 3 & 4 – AVDi, 5 & 6 – PVDi, 7 – PDDi; TI: 1 –DDiSt, 2 & 3 – ADi, 4 – AV, 5 – PV, 6 & 7 – PDi; FE: 1 – DPr, 2 & 3 –ADi, 4 & 5 – PDi, 6 – DDiSt, 7 – AVDi, 8 & 9 – V, 10 – AVPr; TR: 1 – D, 2– ADi, 4 – VSt1, 5 & 6 – PDi, 8 – VSt2; CO: 1–5 & 16–18 – APr, 6–9 – ASp4 – 1, 10 – AVDi, 11 – PVDi, 12 – DDi, 13–15 – PPr. – 1–2. Fore leg. – 3–4. Mid leg. – 5–6. Hind leg. – 1, 3, 5. Anterior aspect. – 2, 4, 6. Posterior aspect.

Tarsus: ADDi 1′, AVDI 2′, DDiSt 1′, PDDi 1′, PVDi 2′, V≈ 10′. The ADDi spine was earlier referred to as DDi, the change is validated from its primary position. Among *Oreodytes* there is a reduction of the V series. This is most pronounced in *O. sanmarkii* where only a few short spinulae are present on the hind tibia. In the other 2 species there is a gradual decrease in numbers of spinulae from the fore to the hind legs. A close examination of the claws shows that 2 minute ventral setae are present on the basal sclerite (pretarsus).

Tibia: ADi 2′, AV 1′, DDiSt 1′, PDi 2′, PV 1′, V≈ 10′. Reduction of V series in *Oreodytes* same as on tarsus.

Femur: ADi 2′, AVDi 1′, AVPr 1′, DDiSt 1′, DPr 1′, PDi 2′, V 2′. The AVDi spine was earlier included in the V series on the fore leg and in the AV series on the 2 others. It has a slightly more proximal position on the fore leg. The more ventrally located PDi spine was earlier included in the PV series. The AVPr spine was earlier included in the AV series. The DPr spine was earlier included in the D series.

Trochanter: ADi 1′, D 1′, PDi 2′, VSt 2′ (1 & 2). As already noted (Nilsson 1987) there are also among *Hydroporus* generally 2' PDi spines.

Coxa: APr 8′, ASp 4′ (1–4), AVDi 1′, DDi 1′, PPr 3′, PVDi 1′. I have earlier not separated the APr and PPr series, their numbers are given only tentatively as they are difficult to count and to separate into discrete series. The DDi spine was earlier included in the D series.

Descriptions of larval instars

Oreodytes alpinus (Paykull, 1798)

Figs. 7–15.

Diagnose. A relatively large larva with a contrastive colour-pattern on head and body. Body not markedly broadened. Urogomphus long with length of basal segment about 4 × as long as last abdominal segment. Legs with a relatively high number of spines. Tarsus with secondary D and PV spines.

First instar

Colour. Body of a uniform brownish-yellow colour; head darker basally and along frontal cleavage lines.

Head. Length 0.55–0.60 mm, width 0.50–0.55 mm.

Body. Length 2.2–2.5 mm, of normal width, subequal to head width; length of LAS 0.17–0.19 mm; length of U1 0.75–0.80 mm, about 2 × as long as U2 and more than 4 × as long as LAS.

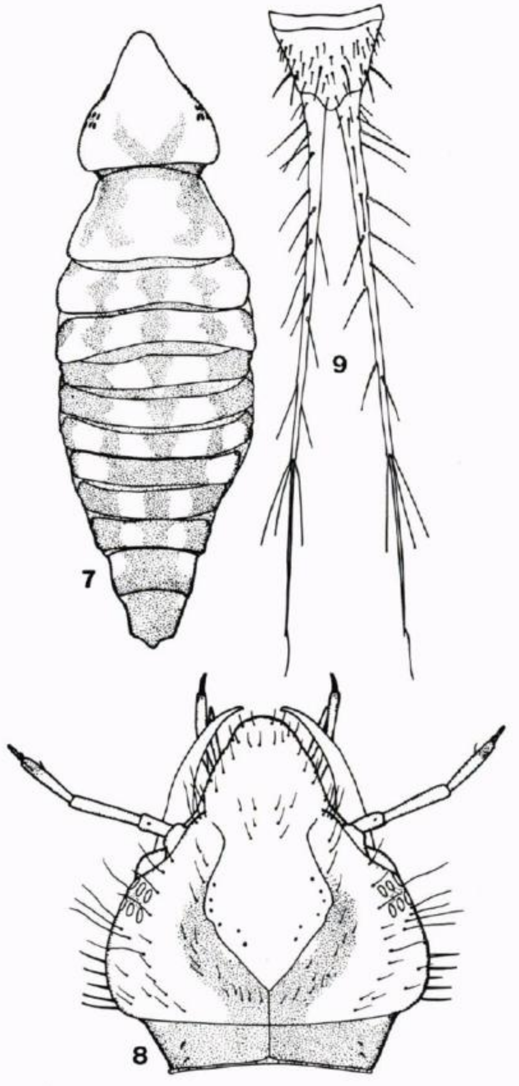
Legs. Tarsus with weak V spines present, their number reduced from fore to hind leg.

Second instar

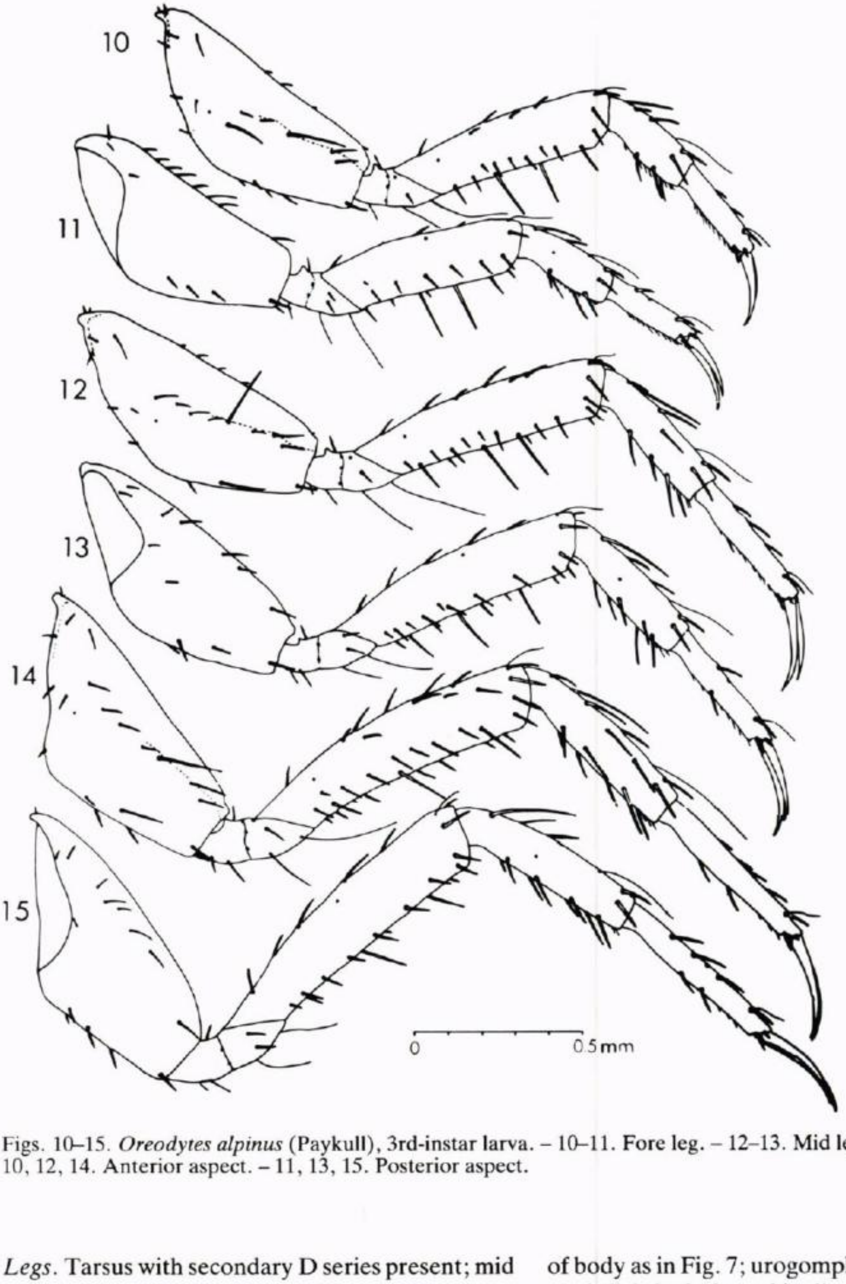
Colour. Head pale yellowish, neck and posterior half of frontal cleavage lines dark brown; antenna and palpi apically darkened; body pale yellowish-grey with brownish spots forming 2 longitudinal sublateral bands.

Head. Length 0.83–0.85 mm; width 0.77–0.80 mm.

Body. Length 3.5–4.0 mm, not broadened, tergal width subequal to head width; length of LAS 0.28–0.30 mm; urogomphus long, U1 1.20–1.25 mm, slightly more than 2 × as long as U2 and more than 4 × as long as LAS.



Figs. 7–9. *Oreodytes alpinus* (Paykull), 3rd-instar larva. – 7. Head and body without appendages, dorsal aspect. – 8. Head, dorsal aspect. – 9. Last abdominal segment with urogomphi, dorsal aspect.



Figs. 10–15. *Oreodytes alpinus* (Paykull), 3rd-instar larva. – 10–11. Fore leg. – 12–13. Mid leg. – 14–15. Hind leg. – 10, 12, 14. Anterior aspect. – 11, 13, 15. Posterior aspect.

Legs. Tarsus with secondary D series present; mid and hind leg also with a PV spine.

Third instar

Colour. Head pale yellowish, neck and posterior half of frontal cleavage lines dark brown; antenna and palpi apically darkened; dorsal colour-pattern of body as in Fig. 7; urogomphi apically darkened; tarsi slightly darkened in distal half.

Head (Fig. 8). Length 1.10–1.20 mm; width 1.01–1.09 mm.

Body. Length 4.5–6.0 mm, only slightly broader than head; length of LAS 0.40–0.50 mm; lenght of U1 1.60–1.85 mm, about 4 × as long as LAS and more than 2 × as long as U2 (Fig. 9).

Legs (Tab. 1, Figs. 10–15). Tarsus with secondary D series present, on mid and hind leg also with 1–2 PV spines; tarsal and tibial V series present but reduced on mid and hind leg; hind tibia with about 12 secondary spines.

Oreodytes sanmarkii (C. R. Sahlberg, 1826)

All 3 larval instars are described in detail by De Marzo (1977). I shall here only give data on leg chaetotaxy together with some measurements of comparative value.

First instar

Head. Length 0.50 mm; width 0.51 mm.
Body. Length of LAS 0.14 mm; length of U1 0.39 mm, U2 only slightly shorter.
Legs. Tarsal V series reduced.

Second instar

Head. Length 0.62–0.66 mm, equalling width.
Body. Length of LAS 0.19–0.21 mm; length of U1 0.44–0.46 mm, equalling U2.
Legs. Tarsal V series reduced.

Third instar

Head. Length 0.78–0.84 mm; width 0.76–0.81 mm.
Body. Length of LAS 0.26–0.33 mm; length of U1 0.53–0.60 mm, U2 slightly longer.
Legs. (Tab 1). Tarsal V spines reduced; tarsus without secondary spines, and with PDDi and ADDi spines short and robust; hind tibia only with 3–4 secondary spines.

Oreodytes septentrionalis (Gyllenhal in C. R. Sahlberg, 1826)

Figs. 1–6, 16–20.

The 3rd instar is described by Bertrand (1932). Matheson (1914) described the same instar of the nearctic *O. scitulus* (LeConte), a species that is very similar to, and maybe conspecific with *O. septentrionalis*. I shall here give more detailed descriptions only of the 2 first instars, and treat the 3rd one (Fig. 16) like those of the preceding species.

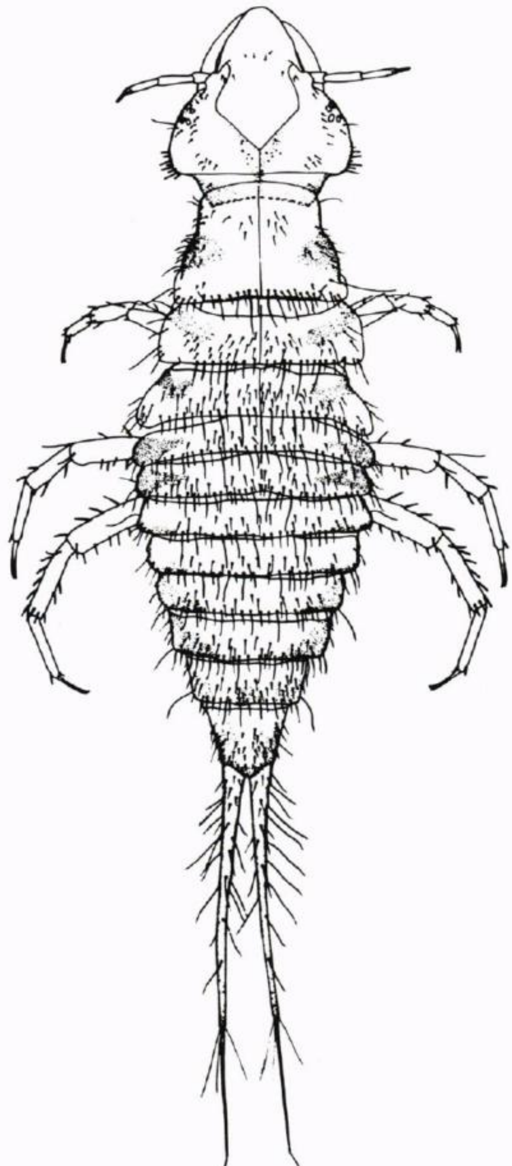
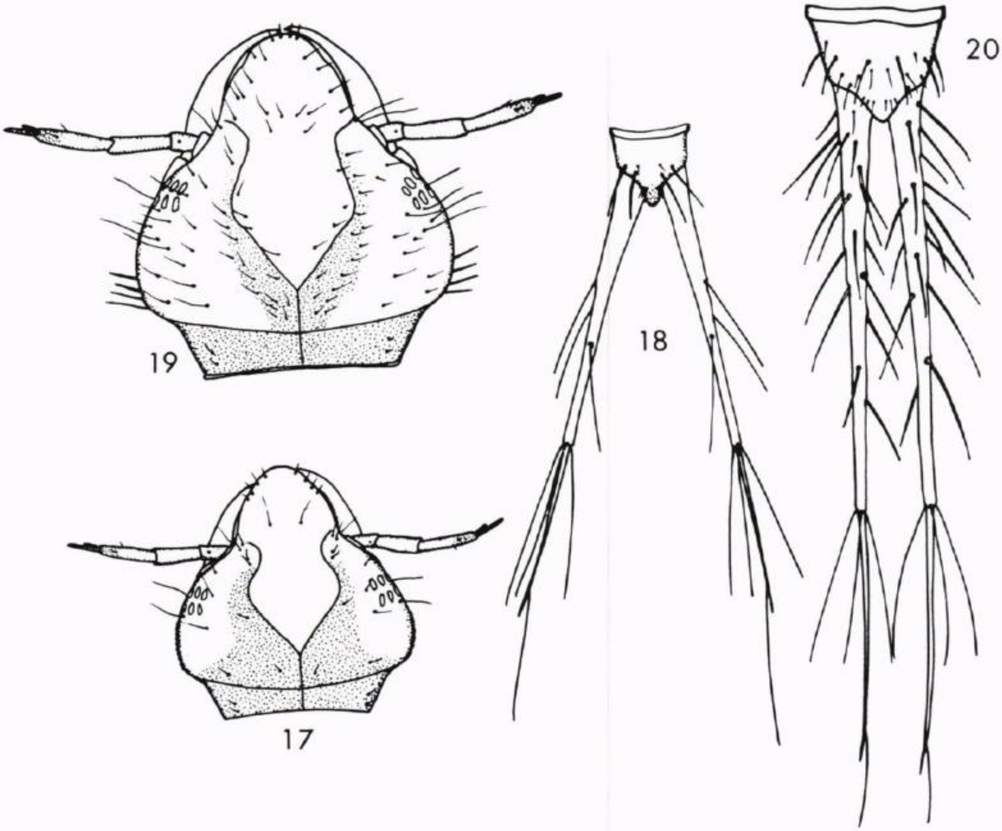


Fig. 16. *Oreodytes septentrionalis* (Gyllenhal), 3rd-instar larva, habitus, dorsal aspect.

First instar

Colour. Body uniformly brownish-yellow; head basally dark brown with posterior extension along frontal cleavage lines (Fig. 17); antenna, legs and urogomphus with slight distal infuscations.



Figs. 17–20. *Oreodytes septentrionalis* (Gyllenhal), larva, dorsal aspect. – 17–18. 1st instar. – 19–20. 2nd instar. – 17, 19. Head. – 18, 20. Last abdominal segment with urogomphi.

Head (Fig. 17). Length 0.53–0.56 mm; width 0.52–0.54 mm.

Body. Length 2.1–2.4 mm, of normal width, subequal to head width; lenght of LAS 0.16–0.18 mm; length of U1 0.62–0.65 mm, slightly less than 2 × as long as U2 (Fig. 18).

Legs (Figs. 1–6). Tarsus with weak V spinulae present, their numbers reduced from fore to hind leg.

Second instar

Colour. Head pale yellow with basal dark brown area extending anteriorly along frontal cleavage lines (Fig. 19); body pale brownish-yellow with 2 sublateral bands of brown spots in posterior half; antenna, palpi, legs and urogomphus distally slightly darkened.

Head. (Fig. 19). Length 0.74–0.78 mm; width 0.70–0.72 mm.

Body. Length 3.0–3.5 mm, not markedly wider than head; length of LAS 0.26–0.27 mm; length of U1 0.97–1.02 mm, about 2 × as long as U2 and almost 4 × as long as LAS (Fig. 20).

Legs. Tarsus without secondary spines, and with V series present but partly reduced.

Third instar

Head. Length 0.92–0.98 mm; width 0.84–0.87 mm.

Body. Length of LAS 0.35–0.38 mm; length of U1 1.29–1.47 mm, about 2 × as long as U2.

Legs (Tab. 1). Tarsus without secondary spines, and with V series present but partly reduced.

Key to larvae of Fennoscandian Oreodytes

The larva of *O. sanmarkii* differs from the 2 other species mainly in its broadened body, short urogomphi, and almost completely reduced tarsal and tibial V series. The larvae of *O. alpinus* and *O. septentrionalis* are relatively similar, and the main differences are the longer urogomphi and the more spinulose legs of the former. Judged from Zimmerman's (1985) analysis *O. alpinus* represents the more derived conditions.

I have not studied larvae of the other European species, viz. *O. davisii* (Curtis) and *O. meridionalis* Binaghi & Sanfilippo. Judged from adult morphology the larvae of these two species will key out as *O. alpinus*.

1. Legs only with primary setae (Figs. 1–6), tibia without PD spine and femur without AV or PV series. Urogomphus only with 7 primary seate (1st instar) ... 2
- Legs also with additional secondary setae, tibia with PD spine and femur with AV and PV series. Urogomphus also with additional secondary setae ... 4
2. Body distinctly wider than head. Urogomphus short and stout, U1 2.5–3 × as long as LAS. Tarsus without V series .... *O. sanmarkii* (C. R. Sahlberg)
- Body not distinctly wider than head. Urogomphus long, U1 3.5–5 × as long as LAS (Fig. 18). Tarsus with V series present, most distinct on fore leg (Fig. 1) 3
3. Length of U1 0.75–0.80 mm, U1/LAS about 4.0 . ... *O. alpinus* (Paykull)
- Length of U1 0.60–0.65 mm, U1/LAS about 3.5 . ... *O. septentrionalis* (Gyllenhal)
4. Abdominal terga 1–7 laterally without spiracles (2nd instar) 5
- Abdominal terga 1–7 laterally with spiracles (3rd instar) 7
5. Tarsus with 2–3 secondary D spines. Length of U1 about 1.2 mm .... *O. alpinus* (Paykull)
- Tarsus only with primary spines. Length of U1 1.0 mm or less 6
6. Tarsus without V series. Body broadened, distinctly broader than head. Urogomphus short and stout, U1/LAS 2.1–2.2 .... *O. sanmarkii* (C. R. Sahlberg)
- Tarsus with V series, most distinct on fore leg. Body not distinctly broader than head. Urogomphus long, U1/LAS 3.6–3.9 ..... *O. septentrionalis* (Gyllenhal)
7. Tarsus with 2–3 secondary D spines (Figs. 10–15). Head length 1.1–1.2 mm. Length of U1 1.6–1.8 mm. .... *O. alpinus* (Paykull)
- Tarsus only with primary spines. Head length 1.0 mm or less. Length of U1 1.5 mm or less 8
8. Body broadened, about 2 × as broad as head. Urogomphus short and stout, length of U1 0.5–0.6 mm .... *O. sanmarkii* (C. R. Sahlberg)
- Body only slightly broader than head (Fig. 16). Urogomphus long, length of U1 1.3–1.5 mm .... *O. septentrionalis* (Gyllenhal)

Natural history

The genus *Oreodytes* is confined to lotic or wave-washed lentic habitats in the Holarctic region. The 3 Fennoscandian species all occur in streams and rivers, and at exposed lake shores, especially at high latitudes or high elevations. In the Gulf of Bothnia, *O. alpinus* is a frequent resident of relatively exposed shores in the archipelagos (Nilsson 1982b).

Adult specimens of *O. sanmarkii* are seemingly independent of the water surface in their respiration (Madsen 1967), and most probably this applies also to the 2 other species studied, as well as their larvae. Solem (1973) collected adult specimens of *O. sanmarkii* down to 5 m depth in a Norwegian lake. When collecting both larvae and adults of *O. sanmarkii* and *O. septentrionalis* in a fast stream (NB: Lahnajoki), most specimens were taken at the downstream side of larger stones. In a larger stream (Råneälven river) I have noted a difference in the habitat selection of these 2 species. Here *O. septentrionalis* was abundant only in more or less isolated gravel-pools in the stream bed, whereas *O. sanmarkii* was collected mainly in the stream itself.

It seems that the flight ability of both *O. sanmarkii* and *O. alpinus* is very low (Eriksson 1972). However, Jackson (1973) mentioned one specimen of the former and several of *O. septentrionalis* with perfect flight muscles. It thus seems that on the average flight is relatively rare in the genus.

Matheson (1914) described the special behaviour of larvae of *O. scitulus* when constructing their pupal chambers. As a suitable moist and soft substrate is often lacking along stony streams, the pupal chambers must be built from small sand deposits left on stones.

Data on life history are few and scattered. Matheson (1914) observed that pupation in *O. scitulus* was frequent in early August. In *O. alpinus*, Palm (1964) found some pupae, also in early August, that emerged after a week. I have collected larvae of *O. alpinus* and *O. sanmarkii* from early July to early August, and those of *O. septentrionalis* throughout July. In a subalpine lake in Norway, larvae of *O. alpinus* were found only in August (Brittain 1978), and Eriksson (1972) collected them in early September in Finnish Lapland. All these observations suggest a type 1 life cycle (Nilsson 1986b), i.e. univoltine with overwintering adults and larval development in summer. This

Tab. 1. Number of spines or setae in the sensillar series of legs showing interspecific variation in the 3rd-instar larvae of *Oreodytes alpinus* (Payk.), *O. septentrionalis* (Gyll.) and *O. sanmarkii* (Sahlb.).

		Fore			Mid			Hind leg		
Sensillar series		*alpinus*	*sanmarkii*	*septen-trionalis*	*alpinus*	*sanmarkii*	*septen-trionalis*	*alpinus*	*sanmarkii*	*septen-trionalis*
coxa:	A	2–4	2	2	4–5	2	2	4–7	2	3
	D	7	7	6	4–6	6	5	4–5	2	3
	V	3–6	1	1	3–4	1	3	4–6	2	2
trochanter:	VSt4	–	–	–	(1)	–	–	1	1	–
femur:	A	0–1	1–2	3	1–2	2	3	2–3	2	5
	AV	5–8	4	4	9	7–8	7	9	8–9	8
	D	2–3	1–2	1	3–4	3	3	4–6	3–4	4
	PV	7	3–4	3	8–9	5–6	5	8	7–8	5
tibia:	A	–	–	–	0–1	–	1	2	–	1–2
	AD	1–2	–	–	2	–	1	3	1	2–3
	AV	1′+1	1′	1′+1	1′+1–2	1′+1	1′+1	1′+2–4	1′+1–2	1′+2
	PD	1	1	1	1	1	1	1	1	1–2
	PV	1′+1	1′	1′	1′+2–3	1′	1′+1	1′+3	1′	1′+2
	V	10′	–	10′	5′	–	5′	3′	–	3′
tarsus:	D	1–2	–	–	1–3	–	–	2–4	–	–
	PV	–	–	–	1	–	–	1–2	–	–
	V	10′	–	10′	5′	–	5′	3′	–	3′

was also confirmed by Dettner et al. (1986) in a detailed study of the phenology and reproduction of *O. sanmarkii* in Germany.

Both larvae and adults are seemingly predators on other aquatic insect larvae, and Dettner et al. (1986) have shown chironomid larvae to be the main food of adult *O. sanmarkii*.

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Sammanfattning

Beskrivningar ges av samtliga ej kända larvstadier av de tre dykararterna *Oreodytes alpinus* (Payk.), *O. sanmarkii* (Sahlb.) och *O. septentrionalis* (Gyll.). En bestämningstabell omfattande samtliga larvstadier presenteras för de ovan nämnda arterna. Den primära behåringen på benen beskrivs i detalj för släktena *Oreodytes* och *Hydroporus*. Biologi och taxonomi inom släktet *Oreodytes* diskuteras.

Recension

Zaguljaev, A. K., Kuznetsov, V. I., Martin, M. O., Sinev, S. Yu., Falkovich, M. I. 1986. *Opredelitel' nasekomych evropejskoj chasti SSSR. Tom IV. Cheshoekrylye. Tretja chast'.* [*Bestämningsbok för insekter från den europeiska delen av SSSR. Band IV. Fjärilar. Del 3.*] Leningrad. 504 s. Pris 5 rubel 50 kopek (svenskt pris okänt).

Åter har en rysk bestämningsbok om fjärilar utgivits och liksom tidigare är det ett lagarbete av de mest framstående ryska lepidopterologerna verksamma i Leningrad. Boken har samma uppläggning som de två tidigare banden i denna serie (recenserade i Ent. Tidskr. 105 (1984)/3: 88–89). Denna gång avhandlas 9 familjer, i huvudsak de som populärt benämns mott (eller pyralider) och fjädermott. Som tidigare finns ett stort antal illustrationer, mestadels av godtagbar kvalitet, till stor del utgörande originalteckningar, sannolikt av resp. författare, men också bilder ur mer eller mindre moderna handböcker (av Rössler, Buszko, Hannemann, m fl) har kopierats. Därvid har en del ofullkomligheter förts vidare och många illustrationer hade vunnit på en omarbetning.

De nära 600 behandlade arterna åtföljs av en kort beskrivning inuti bestämningnycklarna och bilder av hangenitalier, samt i åtskilliga fall av teckningar av hongenitalier och imago. Nomenklaturen är modern och följer de senaste europeiska katalogerna men ibland avviker den i konservativ riktning.

Efter den inledande familjen Carposinidae, som inte är representerad i Sverige, kommer Pterophoridae och Alucitidae. Så följer den udda familjen Thyrididae med en enda art, varefter behandlas samtliga pyralidfamiljer. Speciellt familjen Pterophoridae behandlas mycket utförligt och inte mindre än 140 arter presenteras. Här är det intressant att möta författarens uppfattning om kritiska arter. Beträffande komplexet *Oxyptilus tristis-distans* visas i genitalbilder små och måhända överdrivna skillnader, vilka hittills inte accepterats som så utslagsgivande för central- och sydeuropeiska lepidopterologer. Även inom släktet *Amblyptilia* tycks de uppgivna skillnaderna vara något överbetonade.

Boken är på ryska och innebär därför en del vanskligheter för oss nordiska samlare. Men liksom de två föregående banden innehåller den många användbara illustrationer och med hjälp av ett bra lexikon kan man få reda på båda artkaraktärer, utbredning och värdväxter. I den mån svenska samlare får möjligheten att skaffa boken bör man inte tveka. De ryska faunaböckerna brukar, när de så småningom når den västeuropeiska bokmarknaden, i allmänhet vara prisvärda.

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